United States
Environmental Protection Agency

Air and Radiation
Global Programs Division
6205J

Substitute Refrigerants Under SNAP as of August 21, 2003

SNAP Information: http://www.epa.gov/ozone/snap

EPA has created the Significant New Alternatives Policy (SNAP) Program under section 612 of the Clean Air Act Amendments. SNAP evaluates alternatives to ozone-depleting substances. Substitutes are reviewed on the basis of ozone depletion potential, global warming potential, toxicity, flammability, and exposure potential as described in the March 18, 1994 final SNAP rule (59 FR 13044). Lists of acceptable and unacceptable substitutes will be updated periodically in the Federal Register. The following SNAP notices and subsequent final rules are included in this list: August 26, 1994 (59 FR 44240), January 13, 1995 (60 FR 3318), June 13, 1995 (60 FR 31092), July 28, 1995 (60 FR 38729), February 8, 1996 (61 FR 4736), May 22, 1996 (61 FR 25585), September 5, 1996 (61 FR 47012), October 16, 1996 (61 FR 54030), March 10, 1997 (62 FR 10700), June 3, 1997 (62 FR 30275) , February 24, 1998 (63 FR 9151), May 22, 1998 (63 FR 28251), January 26, 1999 (64 FR 3861), March 3, 1999 (64 FR 10374), April 28, 1999 (64 FR 22982), June 8, 1999 (64 FR 30410), December 6, 1999 (64 FR 68039), April 11, 2000 (65 FR 19327), June 19, 2000 (65 FR 37900), December 18, 2000 (65 FR 78977) , May 23, 2001 (66 FR 28379), March 22, 2002 (67 FR 13272), December 20, 2002 (67 FR 77927), and August 21, 2003 (68 FR 50533).

Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003

Substitutes (Name Used in the Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
HCFC-123	123	R, N	N					
HCFC-22	22	N	N	N	R, N* (buses only)		N (only <115F)	R, N
HCFC-124	124		R, N (CFC-114 only)				R, N	
HFC-134a	134a	N	R, N	R, N	R, N*		N (only <125F)	R, N
HFC-227ea		N	N	N				
HFC-236fa			R, N (CFC-114 only)					
HFC-245fa		N						
R-401A, R-401B	MP-39, MP-66			R, N			R, N	R, N
R-406A	GHG		R, N (R-500 only)		R, N**			R

Key: R = Retrofit Uses, N = New Uses

*These refrigerants are actually "acceptable subject to use conditions." The conditions include 1)the use of unique fittings, 2)the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."

** In addition to the use conditions listed under (*), these refrigerants must be used with barrier hoses.

Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003 (continued)

Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
R-409A (HCFC Blend Gamma)	409A			R, N				R
R-411A, R-411B	411A, 411B			R, N				
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
Free Zone (HCFC Blend Delta)	Freezone / RB-276		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B		R, N (CFC-12, R-500 only)	R, N	R, N**	R,N	R,N	R, N
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost, McCool Chill-it, 414A		R, N (CFC-12, R-500 only)	R, N	R, N**			R, N
GHG-X5	GHG-X5		R, N (CFC-12, R-500 only)	R, N	R, N**			R, N
GHG-HP (HCFC Blend Lambda)	GHG-HP				R, N**			R, N
Freeze 12	Freeze 12		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
411C	G2018C		R, N (CFC-12, R-500 only)	R, N				
THR-02	THR-02		N (CFC-12 only)	N (CFC-12 only)		R, N		
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12		R, N (CFC-12 only)		R, N*	R, N		
Ikon B	Ikon B		R, N (CFC-12 only)	N (CFC-12 only)		R, N		R, N (CFC-12 only)
FOR12A, FOR12B	FOR12A, FOR12B		R, N (CFC-12 only)	R, N (CFC-12 only)		R, N		
SP34E	SP34E			R, N (CFC-12 only)	R, N*			
HCFC-22/HCFC-142b			R, N (CFC-12 only)	R, N (CFC-12 only)				R, N (CFC-12 only)
ISCEON 39TC	ISCEON 39TC		R, N (CFC-12 only)			R,N		
RS-24	RS-24				R,N*	R,N		R, N (CFC-12 only)
R-407C	SUVA 407C, KLEA 407C			R, N (R-502)		R, N (R-502)		R, N (R-502)

Key: R = Retrofit Uses, N = New Uses

*These refrigerants are actually "acceptable subject to use conditions." The conditions include 1)the use of unique fittings, 2)the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."

** In addition to the use conditions listed under (*), these refrigerants must be used with barrier hoses.

Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003 (continued)

Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
Ammonia Vapor Compression		N	N					
Evaporative Cooling		N	N	N	N*			
Desiccant Cooling		N	N	N				
Ammonia / Water Absorption		N	N					
Water / Lithium Bromide Absorption		N	N					
Small Auxiliary Power Units in Tractor Trailers					R, N			

Key: R = Retrofit Uses, N = New Uses

*These refrigerants are actually "acceptable subject to use conditions." The conditions include 1)the use of unique fittings, 2)the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."

** In addition to the use conditions listed under (*), these refrigerants must be used with barrier hoses.

Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003

Substitutes (Name Used in the Federal Register)	Trade Name	ODS Being Replaced	Cold Storage Ware-houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mecha-nical Heat Transfer	Very Low Temp. Ref.
HCFC-22	22	12, 502	R, N	R, N	R, N	N	R, N	N		
HFC-23	23	12, 13, 13B1, 503								R, N
HFC-134a	134a	12	R, N	R, N	R, N	N	R, N	R, N		
HFC-227ea		12	N		N					
HFC-236fa		114							R, N	
HFE-4310mee		all CFCs							R, N	
R-401A, R-401B	MP39, MP66	12	R, N	R, N	R, N	R, N	R, N	R, N		
R-402A, R-402B	HP80, HP81	502	R, N	R, N	R, N	R, N				
R-404A	HP62, 404A	502	R, N	R, N	R, N	R, N	R, N			
R-406A	GHG	12, 500	R	R	R	R	R	R		
R-407A, R-407B	Klea 407A, 407B	502	R, N	R, N	R, N	R, N				
R-408A (HCFC Blend Epsilon)	408A	502	R	R	R	R				
R-409A (HCFC Blend Gamma)	409A	12		R	R	R	R	R		
R-411A, R-411B	411A, 411B	12, 500, 502	R, N	R, N	R, N	R, N	R, N	R, N		
R-507	AZ-50	502	R, N	R, N	R, N	R, N	R, N			
R-508A (PFC Blend Alpha)	KLEA 5R3	13, 13B1, 503								R, N
R-508B	SUVA 95	13, 13B1, 503								R, N
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
Free Zone (HCFC Blend Delta)	Free Zone / RB-276	12	R, N	R, N	R, N	R, N	R, N	R, N		
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost, McCool Chill-it, 414A	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
GHG-X5	GHG-X5	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
(HCFC Blend Lambda)	GHG-HP	12	R, N	R, N	R, N	R, N	R, N	R, N		
FREEZE 12	FREEZE 12	12	R, N	R, N	R, N	R, N	R, N	R, N		
411C	G2018C	12, 500, 502	R, N	R, N	R, N	R, N	R, N	R, N		

Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003 (continued)

Substitutes (Name Used in the Federal Register	Trade Name	ODS Being Replaced	Cold Storage Ware-houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mecha-nical Heat Transfer	Very Low Temp. Ref.
HCFC-22/HCFC-142b		12	R, N	R, N	R, N	R, N	R, N	R, N		
Ammonia Vapor Compression		all	N		N	N				
Galden Fluids		11, 12, 113, 114, 115							R	
Evaporative/Desiccant Cooling		all	N							
Stirling Cycle		all		N						
Direct Nitrogen Expansion		all		N						
Pressure Stepdown		all	N							
CO_2		11, 12, 13, 113, 114, 115, 13B1, 503							R, N	R, N
Cryogenic System Using Recaptured Liquid CO_2 or Liquid Nitrogen	Cryo-Mechanical	12, 500		N						
Self-chilling cans using CO_2		12, 502	R, N	R, N	R, N		R, N			
Volatile Methyl Silixanes, Water, Mineral Oil		11, 12, 113, 114, 115							R, N	
C_3F_8 , C_4F_{10} , C_5F_{12} , $C_5F_{11}NO$, C_6F_{14} , $C_6F_{13}NO$, C_7F_{16} , $C_7F_{15}NO$, C_8F_{18} , $C_8F_{16}O$, and $C_9F_{21}N$									R, N*	
NARM-502		13,13B1,503								R, N
THR-02	THR-02	12	R, N	R, N	R, N	R, N	R, N	R, N		
THR-04	THR-04	502	R, N	R, N	R, N	R, N	R, N	R, N		
HFE-7100, HFE-7200		11, 12, 113, 114, 115							R, N	
HFE-7100, HFE-7200 as a secondary heat transfer fluid in not-in-kind systems		12, 502, 13, 13B1, 503			N (12, 502)					N (13, 13B1, 503)
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12	12	R, N	R, N	R, N	R, N	R, N	R, N		
Ikon B	Ikon B	12	R, N	R, N	R, N	R, N	R, N	R, N		
FOR12A, FOR12B	FOR12A, FOR12B	12	R, N	R, N	R, N	N	R, N	R, N		

Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003 (continued)

Substitutes (Name Used in the Federal Register	Trade Name	ODS Being Replaced	Cold Storage Ware-houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mecha-nical Heat Transfer	Very Low Temp. Ref.
SP34E	SP34E	12	R, N	R, N	R, N		R, N	R, N		
HFC-134a/HBr (92/8)		12, 502		N						
HFC-134a/HBr (92/8) as the primary heat transfer fluid in secondary-loop equipment		12, 502	N		N					
PFC-330ST, PFC-550HC, PFC-660HC, PFC-1100HC, PFC-1100LT, PGC-100, PGC-150, PFC-331ST, PFC-551HC, PFC-661HC, PFC-1101HC, PGC-151	PFC-330ST, PFC-550HC, PFC-660HC, PFC-1100HC, PFC-1100LT, PGC-100, PGC-150, PFC-331ST, PFC-551HC, PFC-661HC, PFC-1101HC, PGC-151	13, 113, 114, blends thereof								R, N
PFC-1102HC, PFC-662HC, PFC-552HC and FLC-15	PFC-1102HC, PFC-662HC, PFC-552HC and FLC-15	13, 113, 114, blends thereof								N
Hydrofluroether 7000	HFE-7000	CFC-11 and CFC-113							R, N	
ISCEON 39TC	ISCEON 39TC	12	R, N							
RS-24	RS-24	12	R,N	R,N	R,N	R,N	R,N	R,N		
NU-22 [R-125/134a/600 (46.6/50.0/3.4)]	NU-22	502	R,N	R,N	R,N	R,N	R,N	R,N		
ISCEON 89	ISCEON 89	R-13B1								R,N
R-407C	SUVA 407C, KLEA 407C	502	R,N	R,N	R,N	R,N	R,N	R,N	R,N	

Key: R = Retrofit Uses, N = New Uses
*Acceptable only where no other alternatives are technically feasible due to safety or performance requirements.

Acceptable Substitutes for Class I (CFCs) Substances in Non-Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003

Substitutes (Name Used in the Federal Register)	Trade Name	ODS Being Replaced	Industrial Process Refrigeration	Ice Skating Rinks	Household Refrigerators	Household Freezers
HCFC-123	123	11	R, N			
HCFC-22	22	12, 502	R, N	R, N	R, N	R, N
HFC-23		13, 13B1, 503	R, N			
HFC-134a	134a	12	R, N		R, N	R, N
HFC-152a		12			N	N
HFC-227ea		12	N			
HFC-236fa		114	R,N			
R-401A, R-401B	MP-39, MP-66	12	R, N	R	R, N	R, N
R-402A, R-402B	HP-80, HP-81	502	R, N			R, N
R-403B	Isceon 69-L	13, 13B1, 503	R, N*			
R-404A	HP-62, 404A	502	R, N			R, N
R-406A	GHG	12, 500	R		R	R
R-407A, R-407B	Klea 407A, 407B	502	R, N	R, N		
R-408A (HCFC Blend Epsilon)	408A	502	R			
R-409A (HCFC Blend Gamma)	409A	12			R	R
R-411A, R-411B	411A, 411B	12, 500, 502	R, N			
R-507	AZ-50	502	R, N			
R-508A (PFC Blend Alpha)	KLEA 5R3	13, 13B1, 503	R, N			
R-508B	Suva 95	13, 13B1, 503	R, N			
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A	12, 500	R, N		R, N	R, N
Free Zone (HCFC Blend Delta)	Free Zone / RB-276	12	R, N	R, N	R, N	R, N
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B	12, 500	R, N	R, N	R, N	R, N
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost, McCool Chill-it, 414A	12, 500	R, N	R, N	R, N	R, N

GHG-X5	GHG-X5	12, 500	R, N		R, N	R, N

Acceptable Substitutes for Class I (CFCs) Substances in Non-Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003 (continued)

Substitutes (Name Used in the Federal Register)	Trade Name	ODS Being Replaced	Industrial Process Refrigeration	Ice Skating Rinks	Household Refrigerators	Household Freezers
(HCFC Blend Lambda)	GHG-HP	12	R, N		R, N	R, N
FREEZE 12	FREEZE 12	12	R, N	R, N	R, N	R, N
411C	G2018C	12, 500, 502	R, N	R, N		
NARM-502	NARM-502	13, 503	R, N			
THR-01	THR-01	12			N	N
THR-02	THR-02	12	R, N		N	N
THR-04	THR-04	502	R, N	R, N	R, N	
HCFC-22/HCFC-142b		12	R, N		R, N	R, N
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12	12	R, N		N	N
Ikon B	Ikon B	12	R, N		N	N
FOR12A, FOR12B	FOR12A, FOR12B	12	R, N		R, N	R, N
SP34E	SP34E	12			R, N	R, N
HFE-7100, HFE-7200 as a secondary heat transfer fluid in not-in-kind systems		11, 12, 114, 115, 502	R, N			
HFC-134a/HBr (92/8)		12, 502	N			
Hydrofluoroether-7000	HFE-7000	11,113	R,N			
ISCEON 39TC	ISCEON 39TC	12	R,N			
RS-24	RS-24	12	R,N	R,N	R,N	R,N
R-407C	SUVA 407C, KLEA 407C	502	R, N	R, N	R, N	R, N
CO_2		13, 13B1, 503	R, N			
Ammonia Vapor Compression		12, 502	R, N	R, N		
Ammonia Absorption		12			N	N
Propane, Propylene, Butane, HC Blend A, B	HC-12a, OZ-12	all	R, N*			
Self-chilling cans using CO_2		12, 502			R, N	
Chlorine		all	R, N			
Evaporative/Desiccant Cooling		all	N			

Key: R = Retrofit Uses, N = New Uses
*Prohibited for other end-uses. See the list of unacceptable refrigerants below.

Unacceptable Substitute Refrigerants
Significant New Alternatives Policy (SNAP) Program as of August 21, 2003

Substitutes (Name Used in the Federal Register)	Trade Name	ODS Being Replaced	End-Uses	Reason
All flammable refrigerants, including OZ-12 (Hydrocarbon Blend A) and HC-12a (Hydrocarbon Blend B)		CFC-12	Motor Vehicle Air Conditioning, retrofit and new	lack of adequate risk assessment that characterizes incremental flammability risk
OZ-12 (Hydrocarbon Blend A) and HC-12a (Hydrocarbon Blend B)	OZ-12, HC-12a	CFC-12	All end-uses other than Industrial Process Refrigeration, retrofit and new	lack of adequate risk assessment that characterizes incremental flammability risk
R-141b		CFC-11	Centrifugal Chillers, new	high ODP, other substitutes with lower overall risk have been identified
R-176*		CFC-12	All end-uses, retrofit and new	contains CFC-12
R-403B		R-502	All end-uses other than Industrial Process Refrigeration, retrofit and new	contains a perfluorocarbon that exhibits extremely high GWP and very long lifetime
R-405A		CFC-12	All end-uses, retrofit and new	contains a perfluorocarbon that exhibits extremely high GWP and very long lifetime
MT-31		all CFCs and HCFCs	All end-uses, retrofit and new	a chemical contained in this blend presents an unacceptable toxicity risk
Hexafluoropropylene (HFP) and all HFP-containing blends		all CFCs and HCFCs	All end-uses, retrofit and new	presents an unacceptable toxicity risk
Self-Chilling Cans using HFC-134a or HFC-152a		CFC-12, HCFC-22, R-502	Household Refrigeration, Transport Refrigeration, Vending Machines, Cold Storage Warehouses and Retail Food Refrigeration; retrofit and new	unacceptably high greenhouse gas emissions from direct release of refrigerant to the atmosphere
NARM-22		HCFC-22	All end-uses, retrofit and new	contains HCFC-22

*R-176 contains CFC-12, HCFC-22. and HCFC-142b. It is a different product from RB-276, typically sold under the name "Freezone."

Acceptable Substitutes for Class II (HCFCs) Substances in Air Conditioning and Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of August 21, 2003

Substitutes (Name Used in the Federal Register)	Trade Name	Household and Light Commercial AC	Commercial Comfort Air Conditioning	Industrial Process Refriger-ation	Industrial Process Air Conditioning	Cold Storage Warehouse Systems	Ice Skating Rinks	Refrigerated Transport	Retail Food Refriger-ation	Ice Machines	Very Low Temp Refriger-ation	Household and other Refrigerated Appliances
R-410A	AZ-20	N	N	N	N	N	N	N	N	N	N	N
R-410B	Suva 9100	N	N	N	N	N	N	N	N	N		N
R-404A	HP62	R,N	R,N	R, N	R,N	R,N	R,N	R,N	R,N	R,N	R,N	R,N
R-407C	Suva 407C, KLEA 407C	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R,N	R, N
R-134a	HFC-134a	N	-	-	-	-	-	-	-	-		-
R-507A	AZ-50	R, N	R, N	R, N	R, N	R, N	-	R, N	R, N	R, N		R, N
Isceon 59, NU-22	Isceon 59, NU-22	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R,N	R, N
R-125/134a/600a (28.1/70.0/1.9)		R, N	R, N	R, N	R, N			R, N				
Hydrofluoroether-7000	HFE-7000										R, N	
RS-44	RS-44	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
Self-chilling cans using CO_2		-	-	-	-	R, N	-	R, N	R, N	-		R, N
Ammonia		N[1]	N[2]	N[3]	N[3]	N[3]	N[3]	-	N[4]	N[3]		N[1]
Evaporative Cooling		N	N	-	N	-	-	-	-	-	-	-
Desiccant Cooling		N	N	-	N	-	-	-	-	-	-	-
Water/Lithium bromide		-	N	-	-	-	-	-	-	-	-	-
THR-03	THR-03	N[5]	N	R, N	N	N	N	R, N	N	N		N
HFE-7100, HFE-7200 as a secondary heat transfer in not-in-kind systems				N								

Key: R = Retrofit Uses, N = New Uses, (-) = Not submitted for review against this end use or not practical to use the substitute refrigerant in this end use.

1. Absorption systems; 2. Absorption chillers or vapor compression with secondary loop; 3. Vapor compression or absorption systems; 4. Vapor compression with a secondary loop; 5. Only approved for window air conditioning units.

Description of Class II End Uses		
End Use	**Air Conditioning and Refrigeration Systems or Applications**	**Ozone Depleting Substance**[1]
Household and Light Commercial Air Conditioning	Heat pumps, central air conditioning, direct-expansion commercial air conditioners, packaged terminal air conditioners, room air conditioners, and split system air conditioners	HCFC-22
Commercial Comfort Air Conditioning	Reciprocating, centrifugal and screw chillers	HCFC-22, CFC-12, R-500, and CFC-11
Industrial Process Refrigeration	Refrigeration applications within the chemical, pharmaceutical and petrochemical industries, the oil and gas industry, the metallurgical industry, civil engineering, sports and leisure facilities, and food processing.	HCFC-22, CFC-12, R-500, and R-502
Industrial Process Air Conditioning	Air conditioning systems that perform a critical mission in a high-temperature industrial environment, such as cooling a control cab on a crane in a foundry or protecting a computer room in a steel mill.	HCFC-22, CFC-12, and CFC-114
Cold Storage Warehouse Systems	Public and private facilities used to store meat, produce, dairy products, frozen food, and other perishable goods.	HCFC-22, R-502 and CFC-12
Ice Skating Rinks	Ice Skating Rinks	HCFC-22, CFC-12, and R-502
Refrigerated Transport	Refrigeration systems in trucks, trailers, railcars, ships, internodal containers, on board ships, and air conditioning systems in buses and passenger trains.	CFC-12, R-500 and R-502
Retail Food Refrigeration	Stand alone refrigeration cases found in small markets, convenience stores, restaurants and other food establishments, large systems found in supermarkets, and HCFC-22 systems found in a wide variety of retail and service establishments.	HCFC-22, CFC-12, and R-502
Ice Machines	Small, medium, and large ice makers used by a number of entities including restaurants and hotels.	CFC-12
Household and Other Refrigerated Appliances	Refrigerators, freezers, water coolers, vending machines, and dehumidifiers.	CFC-12 and R-502

1. Substitution through retrofit is only applicable to HCFC-22 systems.

Refrigerant blends that contain Class II Ozone Depleting Substances include, but are not limited to, R-401A, R-401B, R-402A, R-402B, R-406A, R-408A, R-409A, R-411A, R-411B, R-411C, R-414A, R-414B, and R-416A.

Alternative Refrigerant Manufacturers

Refrigerant	Atofina Chemicals	Dupont	Greencool	Honeywell	ICI	ICOR	IKON	InterCool Distribution, LLC	People's Welding Supply	RMS of Georgia	Rhodia Ltd.	Solpower	Technical Chemical	TechnoChem Co., Ltd.[1]	Tsinghua University of Beijing[2]
	800-343-7940	800-235-7882	703-643-2376	800-522-8001	800-275-5532	800-357-4062	505-345-2707	800-555-1442	800-382-9006	800-347-5872		888-289-8866	800-527-0885		
HCFC-123	Forane 123	Suva 123		Genetron 123											
HCFC-22	Forane 22	Freon 22		Genetron 22	Arcton-22										
HFC-134a	Forane 134a	Suva 134a		Genetron 134a	Klea 134a										
HCFC-124	Forane 124	HCFC-124		Genetron 124											
R-401A, R-401B	Forane 401A, 401B	Suva MP39, MP66		MP39, MP66											
R-402A, R-402B	Forane 402A, 402B	Suva HP80, HP81		HP80, HP81											
R-404A	Forane 404A	Suva HP62		Genetron 404A											
R-406A									GHG						
R407A, R-407B					Klea 407A, 407B										
R-407C	Forane 407C	Suva 407C (Suva 9000)			Klea 407C (Klea 66)										
R-408A	Forane 408A	Suva 408A		Genetron 408A											
R-409A	Forane 409A	Suva 409A		Genetron 409A											
R-411A, R-411B			R-411A, B												
R-507		Suva 507		AZ-50											
R-508A (PFC Blend Alpha)					Klea 5R3										
R-508B		Suva 95													
HCFC Blend Beta								FRIGC FR-12							
HCFC Blend Delta										Free Zone / RB-276					
GHG-X4									Autofrost / Chill-It						
GHG-X5									GHG-X5						

GHG-HP									GHG-HP						
Hot Shot						Hot Shot									
Blend Zeta							Ikon-12, Ikon A								

Alternative Refrigerant Manufacturers (continued)

Refrigerant	Atofina Chemicals	Dupont	Greencool	Honeywell	ICI	ICOR	IKON	InterCool Distribution, LLC	People's Welding Supply	RMS of Georgia	Rhodia Ltd.	Solpower	Technical Chemical	TechnoChem Co., Ltd.[1]	Tsinghua University of Beijing[2]
	800-343-7940	**800-235-7882**	**703-643-2376**	**800-522-8001**	**800-275-5532**	**800-357-4062**	**505-345-2707**	**800-555-1442**	**800-382-9006**	**800-347-5872**		**888-289-8866**	**800-527-0885**		
Blend Zeta															
Ikon B							Ikon B								
Freeze 12													Freeze 12		
G2018C			R-411C												
THR-02, THR-03															THR-02, THR-03
Isceon 59											Isceon 59				
FOR12A, FOR12B														FOR12A, FOR12B	
NU-22						NU-22									
SP34E												SP34E			

1 and Inha University
2 and the Beijing Inoue Qinghua Refrigeration Technology Company LTD